



National Aeronautics  
and Space Administration

February 12, 1999  
AO 99-OSS-XX

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**Draft**

**Announcement of  
Opportunity**

**Outer Planets Program  
Including  
Europa Orbiter,  
Pluto-Kuiper Express,  
and  
Solar Probe**

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Comments due:

March 5, 1999

February 12, 1999

Dear Colleague:

The Office of Space Science in the National Aeronautics and Space Administration is pleased to release a draft of the first Announcement of Opportunity for the Outer Planets Program for your review and comment.

Comments in writing should be sent to:

Dr. David Gilman  
Mail Stop 160  
NASA Langley Research Center  
Hampton VA 23681-2199

Comments may also be sent through electronic mail to:

D.A.Gilman@LaRC.NASA.gov

Please also be aware that NASA and the French Space Agency (the Centre National D'Etudes Spatiales) are considering the possibility of a French Principal Investigator taking the lead on one of the sensors for the Solar Probe Mission, in collaboration with U.S. Co-Investigators. This sensor would ultimately become part of one of the two integrated instrument packages that are being solicited for this mission. The issue of which sensor (if any) will be decided before the final AO is released, and the decision will be reflected in the wording of the AO.

Thank you for your interest in space science.

Sincerely,

Dr. Jay Bergstralh  
Outer Planets Program Scientist

**Outer Planets Program  
Including  
Europa Orbiter,  
Pluto-Kuiper Express,  
and  
Solar Probe**

**Draft**

**Announcement of Opportunity  
Soliciting Proposals  
for Basic Research in Space Science**

AO 99-OSS-XX  
Issued: XXX

Draft Issued: February 12, 1999  
Comments Due: March 5, 1999

Office of Space Science  
National Aeronautics and Space Administration  
Washington, DC 20546-0001

# OUTER PLANETS PROGRAM ANNOUNCEMENT OF OPPORTUNITY

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# **ANNOUNCEMENT OF OPPORTUNITY**

## **OUTER PLANETS PROGRAM**

### **1. Description of Opportunity**

#### **1.1 Introduction**

The National Aeronautics and Space Administration's (NASA) Office of Space Science (OSS) announces the opportunity to conduct scientific investigations as part of NASA's Outer Planets Program. This Announcement of Opportunity (AO) solicits scientific investigations for the first three missions in this program: Europa Orbiter, Pluto-Kuiper Express, and Solar Probe.

In particular, through this AO NASA will accept proposals for scientific investigations that:

- 1) Use the facility radar instrument on the Europa Orbiter;
- 2) Use data on the gravity field of Europa derived from Doppler tracking;
- 3) Develop and use Europa Orbiter remote sensing instrumentation;
- 4) Develop and use Pluto-Kuiper Express remote sensing instrumentation;
- 5) Develop and use Pluto-Kuiper Express radio science instrumentation;
- 6) Develop and use Solar Probe remote sensing instrumentation; and
- 7) Develop and use Solar Probe in situ sensing instrumentation.

Proposals will be accepted in a staggered series of due dates, starting with the proposals for Europa Orbiter, followed by proposals for the Pluto-Kuiper Express and then for Solar Probe (see Section 1.3 below).

Requirements and guidelines contained in the body of this AO, in Appendix A, entitled "General Instructions and Guidelines," and in Appendix I, entitled "Education/Public Outreach Proposals as Part of Proposals to the Outer Planets Program" apply to all proposals submitted in response to this AO. For each mission there are two additional appendices: Guidelines for Proposal Preparation, which are slightly different from mission to mission, and a Mission and Project Description, which gives mission-specific requirements (Appendices B and C for Europa Orbiter, Appendices D and E for Pluto-Kuiper Express, and Appendices F and G for Solar Probe). In addition, some technical data, scientific summaries, and links to procurement regulations will be found in the on-line, Outer Planets Program Library, which can be accessed through Internet URL <http://outerplanets.LaRC.NASA.gov/outerplanets>; Appendix H of this AO lists the contents of the Outer Planets Program Library.

## 1.2 Background

In order to achieve the highest possible synergy and reduce cost, the first three missions in the Outer Planets Program are being implemented as a single project, called the Outer Planets/Solar Probe Project at the Jet Propulsion Laboratory (JPL). Although ultimately targeted for three very different destinations, all three missions will travel past Jupiter. The three spacecraft will, therefore, potentially share a common suite of avionics, along with certain telecommunications and propulsion components. Core software may also be common, including the software controlling common spacecraft functions, and all three missions will be operated during their long cruise periods by a single project team.

Most of the common components of these missions are being developed and qualified by the Deep Space System Technology Program's X2000 First Delivery Project at JPL. Components developed in the X2000 First Delivery Project will also be available, through the Outer Planets/Solar Probe Project, to selected instrument development investigators. A description of these available components can be found in the Outer Planets Program Library, available through Internet URL <http://outerplanets.LaRC.NASA.gov/outerplanets>.

Some aspects of the three missions are clearly unique, most notably the science and instrumentation, trajectories, thermal shielding for Solar Probe, and propulsion and radiation shielding for the Europa Orbiter. Launch systems will also differ, depending on availability and performance. In spite of these differences, a single team approach to all three missions will: 1) complete preliminary design of the three flight systems, 2) design the trajectories and mission maneuvers, and 3) manage the preparation of the launch systems. As each mission in turn enters detailed design, a dedicated mission implementation team will be formed. Members of the selected science investigation teams are expected to become part of the flight system and mission/trajectory design teams. After launch, a single, unified flight operations team will operate the flight system.

## 1.3 Schedule

Announcement of Opportunity release.....	XXX
Preproposal conference.....	XXX (three weeks after release)

### **Europa Orbiter**

Notice of Intent to propose due.....	XXX
Proposal submittal due by 5:00 pm Central Time.....	XXX
Letters of endorsement for non-U.S. participation due.....	XXX
Announcement of Selections (target).....	XXX
Award of funding (target).....	XXX

### **Pluto-Kuiper Express**

Notice of Intent to propose due.....	XXX
Proposal submittal due by 5:00 pm Central Time.....	XXX
Letters of endorsement for non-U.S. participation due.....	XXX
Announcement of Selections (target).....	XXX
Award of funding (target).....	XXX

### **Solar Probe**

Notice of Intent to propose due.....	XXX
Proposal submittal due by 5:00 pm Eastern Time.....	XXX
Letters of endorsement for non-U.S. participation due.....	XXX
Announcement of Selections (target).....	XXX
Award of funding (target).....	XXX

(Proposals are due at 5:00 local time at the address given in the appropriate, mission specific Guidelines for Proposal Preparation appendix to this AO. For the Europa Orbiter and Pluto-Kuiper Express opportunities, the address is in the Central Time zone while for Solar Probe opportunity, the address is in the Eastern Time zone.)

## **1.4 Relationship to Other Opportunities**

As each mission approaches its prime mission target, NASA expects to seek additional scientific investigators through separate AO's. Furthermore, scientific data from each mission will be made available to the scientific community for research through other programs. In addition, NASA anticipates that if the Outer Planets Program is approved, it will continue to define new missions to Jupiter and beyond, for which NASA would intend to issue further AO's.

For the Solar Probe mission, NASA plans to issue an announcement soliciting participation as a member of a separate Science Steering Team that will review developments in technology that might be applied to the scientific investigations selected through this AO.

## **2. Program Constraints, Requirements, and Guidelines**

### **2.1 General Program Constraints and Guidelines**

Every organization submitting a proposal in response to this NRA must designate a single *Principal Investigator* (PI) who will be responsible for the quality and direction of the



entire proposed investigation and for the use of all awarded funds. Note that NASA does not accept the designation of a "Co-Principal Investigator;" there must be only one PI who is solely responsible for an investigation.

NASA strongly encourages proposers to identify only the most critically important personnel to aid in the execution of their proposals. Should such personnel be required, *Co-Investigators* (Co-I's) may be identified who are critical for the successful completion of an investigation through the contribution of unique expertise and/or capabilities, and who serve under the direction of the PI whether or not they receive compensation directly under the award. A Co-I must have a well-defined role in the investigation that is explicitly defined in the Management section of the proposal (see Section 3.6 of the appropriate Guidelines for Proposal Preparation appendix). In addition, for all proposals submitted in response to this AO, evidence of the commitment of a Co-I to participate in the proposed investigation is now required by way of a brief letter from him/her even if they are from the same institution as that of the PI (see Section 3.8 of the appropriate Guidelines for Proposal Preparation appendix).

Proposals may also identify *Collaborators* who are individuals that are less critical to the overall proposal than a Co-I but who are committed to provide a focused though unfunded contribution to a specific task. As for Co-I's noted above, proposals submitted in response to this NRA must include a brief letter of commitment from each Collaborator that describes their specific, intended contribution to the investigation.

While the PI's of Science Team Member investigations may propose additional staff to help them fulfill their responsibilities in performing the investigation, the PI is the only person the proposal may offer as an investigator. Co-Investigators are not allowed on Science Team Member proposals. Investigators proposing to be members of either of the two Europa Orbiter Science Teams may, as part of their proposal, also propose to serve as the Team Leader. NASA will choose a Team Leader for each of these two Europa Orbiter Science Teams.

Additional constraints and guidelines for each mission can be found in its mission-specific appendices of this AO (Appendices B and C for Europa Orbiter, Appendices D and E for Pluto-Kuiper Express, and Appendices F and G for Solar Probe).

NASA anticipates selecting up to:

- Six Science Team Member investigations to use the facility radar instrument on the Europa Orbiter; and
- Six Science Team Member investigations to use data on the gravity field of Europa.

NASA anticipates selecting five scientific investigations, the completion of which will require the development and use of flight instrumentation--one each for:

- Europa Orbiter remote sensing (other than radar and gravity mapping);
- Pluto-Kuiper Express remote sensing;
- Pluto-Kuiper Express radio science;
- Solar Probe remote sensing; and
- Solar Probe *in situ* sensing.

NASA anticipates that the instrumentation developed by the five selected investigations will be complete packages as defined in Section 3 of the appropriate Guidelines for Proposal Preparation appendix.

NASA may also select additional investigations that require the development and use of flight instrumentation. While NASA reserves the right to select single-instrument investigations and/or to make partial selections of investigations offering packages of instruments, NASA does not currently foresee a requirement that would be compelling enough to make such selections necessary. Nonetheless, proposals addressing high-priority science with flight instrumentation that is not be available to NASA through the other proposed instrument packages will be accepted and evaluated for possible selection.

The French Space Agency (the Centre National D'Etudes Spatiales) has advised NASA of its strong interest in collaboration on both scientific and engineering aspects of the Solar Probe Mission and spacecraft. U.S. proposers are therefore encouraged to consider partnership with French Co-Investigators for part(s) of the integrated remote sensing or *in situ* instrument packages that are being solicited for this mission. See section 2.8 of this AO for guidelines on international participation.

## 2.2 Caveats and Baseline for Preparing Proposals

The Outer Planets Program is still in the formative stage, and proposers should expect that evolution will occur in response to changes in the fiscal climate, technology developments, and personnel changes. In addition, NASA has not yet endorsed the Project Plans on which this AO is based. Nonetheless, the schedules and budgets presented in this AO are to be used as the basis for the preparation and evaluation of all proposals.

## 2.3 Science Requirements

The NASA Science Definition Teams for each mission carefully considered the range of science objectives appropriate for their missions and prioritized them. These objectives

have been endorsed by the appropriate Subcommittees of NASA's Space Science Advisory Committee and will serve as the basis for the evaluation of scientific merit of proposed investigations. Group 1 objectives, as given below, are considered essential for each mission and have the highest priority and are considered of equal priority within that group. Other objectives are listed in successive groups, in order of descending priority. Group 2 objectives are considered important but not mandatory while Group 3 are considered to be desirable but of lesser importance.

In addition to prioritized science objectives, the Science Definition Teams also defined measurement objectives and goals for meeting the Group 1 objectives. A summary of each mission's measurement objectives and a description of a strawman instrument set thought to be capable of achieving the measurement objectives can be found in the appropriate Mission and Project Description appendix to this AO.

### 2.3.1 Europa Orbiter Science Objectives

#### Group 1 Objectives:

- Determine the presence or absence of a subsurface ocean;
- Characterize the three-dimensional distribution of any subsurface liquid water and its overlying ice layers; and
- Understand the formation of surface features, including sites of recent or current activity, and identify candidate landing sites for future lander missions.

#### Group 2 Objectives:

- Characterize the surface composition, especially compounds of interest to prebiotic chemistry;
- Map the distribution of important constituents on the surface; and
- Characterize the radiation environment in order to reduce the uncertainty for future missions, especially landers.

### 2.3.2 Pluto-Kuiper Express Science Objectives

#### Group 1 Objectives:

- Characterize the global geology and morphology of Pluto and Charon;
- Map surface composition of Pluto and Charon; and
- Characterize the neutral atmosphere of Pluto and its escape rate.

### Group 2 Objectives:

- Characterize the time variability of Pluto's surface and atmosphere;
- Image Pluto and Charon in stereo;
- Map the terminators of Pluto and Charon with high resolution;
- Map the surface composition of selected areas of Pluto and Charon with high resolution;
- Characterize Pluto's ionosphere and solar wind interaction;
- Search for neutral species including H, H<sub>2</sub>, HCN, and C<sub>x</sub>H<sub>y</sub>, and other hydrocarbons and nitriles in Pluto's upper atmosphere, and obtain isotopic discrimination where possible;
- Search for an atmosphere around Charon;
- Determine bolometric bond albedos for Pluto and Charon; and
- Map the surface temperatures of Pluto and Charon.

### Group 3 Objectives:

- Characterize the energetic particle environment of Pluto and Charon;
- Refine bulk parameters (radii, masses, densities) and orbits of Pluto and Charon;
- Search for a magnetic fields from Pluto and Charon; and
- Search for additional satellites and rings.

### 2.3.3 Solar Probe Science Objectives

#### Group 1 Objectives

- Determine the acceleration processes and find the source regions of the fast and slow solar wind at maximum and minimum solar activity;
- Locate the source and trace the flow of energy that heats the corona;
- Construct the three-dimensional density configuration from pole to pole, and determine the subsurface flow pattern, the structure of the polar magnetic field and its relationship with the overlying corona; and
- Identify the acceleration mechanisms and locate the source regions of energetic particles, and determine the role of plasma turbulence in the production of solar wind and energetic particles.

#### Group 2 Objectives:

- Investigate dust rings and particulates in the near-Sun environment;
- Determine the outflow of atoms from the Sun and their relationship to the solar wind; and
- Establish the relationship between remote sensing, near-Earth observations at 1 AU and plasma structures near the Sun.

#### Group 3 Objectives:

- Determine the role of x-ray microflares in the dynamics of the corona; and
- Probe nuclear processes near the solar surface from measurements of solar gamma rays and slow neutrons.

### 2.4 Formation of Integrated Implementation Teams

PI's of selected instrument investigations and the person on each PI's team responsible for the instrument development effort will become members of an Integrated Implementation Team for their respective mission. The primary interfaces each PI's team will have with their mission's Integrated Implementation Team are described in the appropriate Mission and Project Description appendix of this AO.

PI's of selected Europa Orbiter Science Team Member investigations will participate primarily through the Science Teams for which they were selected. The selected Europa Orbiter Team Leaders will lead the Science Teams and represent the Science Teams on the Europa Orbiter Integrated Implementation Team.

Throughout the entire design, development, launch, cruise, and data gathering phases of the missions, the members of each Integrated Implementation Team will need to be available for frequent, on-line, concurrent working sessions using telephone, video conference, E-mail, and computer-based work group tools. The working environment and other project work requirements are described in the appropriate Mission and Project Description appendix.

Overall project leadership and coordination for each mission is provided by the Project Manager and the Project Office staff. The Project Scientist role is assigned to the Project's Chief Scientist who is a member of the Project Office staff, appointed by and reporting to the JPL Center Director. Each mission will have a Mission Scientist who reports to the Chief Scientist. The Mission Scientists will serve as Deputy Project Scientists for their missions.

## 2.5 Data Rights, Use, and Publication

The following rules apply to rights, use, and publication of data from the Outer Planets missions:

- 1) There is no proprietary period for any data collected by instruments on the Outer Planets missions.
- 2) A portion of the data will be released early as Public Information Office releases and postings on the World Wide Web or equivalent.
- 3) Science instrument data are subject to a validation period of no more than six months from the time of acquisition to allow its calibration and formatting. After calibration and formatting, the data from the missions are to be placed in the appropriate repository for access by the scientific community (data from the Europa Orbiter and the Pluto-Kuiper Express are to be deposited in NASA's Planetary Data System while the data from Solar Probe are to be deposited in NASA's National Space Science Data Center). Data in these repositories will contain the appropriate calibration information and ancillary data that will be updated throughout the period of investigation.
- 4) NASA expects that all investigators selected through this AO will publish their results in a timely manner in the open scientific literature.

## 2.6 Education/Public Outreach

OSS expects education and public outreach to be a significant part of each OSS flight program and research discipline, and strongly encourages space science researchers to engage actively in education and public outreach as an important component of their NASA-supported professional activities. In order to achieve this goal, OSS has developed a comprehensive approach for making education at all levels (with a particular emphasis on K-14 education) and the enhancement of public understanding of space science integral parts of all of its missions and research programs. The two key documents that establish the basic policies and guide all OSS education and outreach activities are a strategic plan entitled *Partners in Education: A Strategy for Integrating Education and Public Outreach Into NASA's Space Science Programs* (March 1995), and an accompanying implementation plan entitled *Implementing the Office of Space Science (OSS) Education/Public Outreach Strategy* (1996). Both can be accessed by selecting "Education and Outreach" from the menu on the OSS homepage at Internet URL <http://spacescience.nasa.gov>, or from Dr. Jeffrey Rosendhal, Office of Space Science, Code S, NASA Headquarters, Washington, DC 20546-0001, USA.

In accord with these established OSS policies, Education and Public Outreach (E/PO) will be an integral element of the Outer Planets/Solar Probe Program, and 1-2% of the total program budget will be allocated to education and outreach. All selected, NASA-funded, scientific

participants will be expected to become actively involved in planning and implementing an E/PO program.

The approach being taken to involving scientists in the Outer Planets/Solar Probe Program in E/PO has been specifically tailored to recognize that, in general, there are two broad classes of scientific participants whose investigations will be of very different scientific and financial scope. Expectations concerning the nature of participation in E/PO for these two classes of scientific investigations are different.

- 1) Instrument investigations are required to include an E/PO component as a part of their overall proposal. OSS expects that a substantive education/outreach program will be an integral element of the investigation and that proposers will devote adequate resources to the planning and implementation of such an effort. The general funding guidelines for E/PO for the mission as a whole also apply to the E/PO component of instrument investigations. Proposals must include the Principal Investigator's approach for planning an education/outreach program, arranging for appropriate partners and alliances, implementing the education/outreach program (including appropriate evaluation activities), and plans for disseminating education/outreach products and materials. See Appendix I for further information on expected proposal content. The E/PO components of proposals will be evaluated by appropriately qualified scientific, education, and outreach personnel, and those evaluations will be considered by the Selecting Official as part of the overall selection process. Section 4 contains further information on the proposal evaluation and selection process and the role of E/PO in that selection process. As indicated in that section, E/PO will not be considered as part of the Categorization process--which will be based entirely on the scientific and technical merits of the proposal--but as one of the other factors to be considered in considering the relative merits of closely competing proposals in subsequent stages of the selection process.
- 2) Science Team Members will be expected to participate in the common Outer Planets/Solar Probe Education/Public Outreach program (see below) that is now being defined. OSS expects that individual participating scientists (including members of their supporting team) should be prepared to spend an average of approximately 5% of their time, as part of their normal ongoing work, supporting Education/Public Outreach activities. Such activities may include, but not be limited to: developing ideas for creative and worthwhile educational materials; preparing written background information suitable for primary and secondary school educational resources; and preparing portions of their mission's data for use in educational and public outreach materials. Science Team Member proposals must include an explicit statement in

the Contractual Statement of Work that proposers are willing to participate in E/PO on this basis and must budget appropriately for such work as part of their proposal.

Specific instructions for including proposals for Education/Public Outreach efforts can be found in the appropriate Guidelines for Proposal Preparation appendix and in Appendix I. Other important information concerning the expected content of E/PO proposals, the evaluation criteria to be used to rate proposals, and assistance available from the OSS Education/Outreach "Ecosystem" can be found in Appendix I.

It should be noted that, in addition to their individual E/PO programs, selected, NASA-funded instrument investigator teams (together with Science Team Members) will be expected to become actively involved in creating, designing, planning, and implementing a common Outer Planets/Solar Probe Education/Public Outreach program to be carried out by the Outer Planets/Solar Probe Project. Several steps will be taken after selection to define, ensure and enable active participation in the common program and to coordinate and integrate unique instrument investigator E/PO programs into the overall program. These include planning workshops that will focus on ways to fulfill NASA's education and outreach objectives, to encourage the flow of creative ideas, to inspire innovative approaches, and to define and implement an integrated E/PO program. Components will be integrated through a variety of collaborative processes designed to produce a consensus master Education/Public Outreach Plan that will meet NASA's and OSS's education and outreach objectives.

## 2.7 Schedule and Cost Requirements

### 2.7.1 Schedule Requirements

Proposals must specify periods of performance extending from the expected selection date through the nominal date of the end of analysis, using the following nominal dates for key mission milestones:

#### Europa Orbiter

Launch.....	November 2003
Jupiter Orbit Insertion.....	August 2006
Europa Orbit Insertion.....	May 2008
End of analysis.....	June 30, 2009

#### Pluto-Kuiper Express

Launch.....	December 2004
Fly by Jupiter.....	March 2006
Fly by Pluto.....	December 2012
End of analysis.....	June 30, 2014



### Solar Probe

Launch.....	February 2007
Fly by Jupiter.....	June 2008
First flyby of Sun.....	October 2010
Second flyby of Sun.....	January 2015
End of analysis.....	March 31, 2016.

All proposals must include separate budgets for each year.

#### 2.7.2 Limitations on Funding

NASA has only a limited amount of funding for the selected investigations. During the compliance check, NASA will examine the budgets of all proposals to make sure they fit within the limitations given in the appropriate Mission and Project Description appendix to this AO.

#### 2.7.3 Full Cost Accounting

If a proposal offers NASA-provided services, the proposed budget must include the full cost of Civil Service labor and NASA Center infrastructure support. If NASA guidance for full cost accounting has not been fully developed by the closing date for proposal submission, NASA Centers should submit cost proposals based on the instructions in the NASA Financial Management Manual, Section 9091-5, "Cost Principles for Reimbursable Agreements," or based on their own, Center-approved, full-cost accounting models. Other Federal Government elements of proposals must follow their agency's cost accounting standards for full cost. If no standards are in effect, the proposers must then follow the Managerial Cost Accounting Standards for the Federal Government as recommended by the Federal Accounting Standards Advisory Board.

### 2.8 International Participation

Recognizing the potential scientific, technical, and financial benefits offered to all partners by international participation, participation by non-U.S. individuals and organizations as Principal Investigators, Co-Investigators, or team members in Outer Planets investigations is encouraged. Participation may include, but is not limited to, the contribution of instrument hardware, necessary facilities and services, and the subsequent sharing of the data from the mission, all on a no-exchange-of-funds basis.

The direct purchase of goods and/or services from non-U.S. sources is also permitted. Proposers are advised, however, that a contract or subcontract by a U.S. team with a non-U.S. participant using funds derived from NASA must meet NASA and Federal regulations. Proposers are further advised that these regulations will place an additional burden on investigation teams that should be explicitly included in discussions of the investigation's cost, schedule, and risk management. Information regarding regulations governing the procurement of foreign goods or services is provided in the Outer Planets Program Library, available through Internet URL <http://outerplanets.LaRC.NASA.gov/outerplanets>.

Participation by non-U.S. individuals and/or institutions as team members or contributors to Outer Planets investigations must be endorsed by the institutions and/or governments involved. If government support is required, then a government endorsement is also needed. The letter of endorsement must provide evidence that the non-U.S. institution and/or government officials are aware and supportive of the proposed investigation and will pursue funding for the investigation if selected by NASA. Such endorsements must be submitted per the appropriate schedule in Section 1.3.

## 2.9 Reference for Further Information

Questions about this AO in general and questions about the Europa Orbiter and the Pluto-Kuiper Express opportunities in particular may be directed to the NASA Outer Planets Program Scientist:

Dr. Jay Bergstralh  
Research Program Management Division  
Code SR  
NASA Headquarters  
Washington DC 20546-0001  
Telephone: (202) 358-0313  
E-mail: Jay.Bergstralh@hq.NASA.gov

Questions specifically about the Solar Probe opportunity may be directed to the NASA Solar Probe Program Scientist:

Dr. W. Vernon Jones  
Research Program Management Division  
Code SR  
NASA Headquarters  
Washington DC 20546-0001  
Telephone: (202) 358-0885  
E-mail: Vernon.Jones@hq.NASA.gov

## 2.10 Preproposal Conference

A preproposal conference covering all three missions will be held at the Lunar and Planetary Institute, 3600 Bay Area Boulevard, Houston, TX, beginning at 8:30 a.m. on the date given in Section 1.3. The conference will begin with a presentation of answers to questions received up to that time about the AO. Following the presentation, the conference will be open to questions from the attendees. Although representatives from NASA and JPL will attempt to answer the questions at the conference, some questions will have to be researched and answered later. In any case, the answers to questions and a transcript of the conference will be available through the Outer Planets Program Library which can be accessed through Internet URL <http://outerplanets.LaRC.NASA.gov/outerplanets>.

## 2.11 Updates to the AO

Updates to the Outer Planets AO will be posted on the OSS Research Opportunities website, accessible through the OSS Homepage at Internet URL <http://spacescience.nasa.gov>.

## **3. Proposal submission information**

### 3.1 Notice of Intent to Propose

NASA strongly encourages all prospective proposers to submit a Notice of Intent in accordance with the schedule in Section 1.3. Proposers must prepare this Notice of Intent in English and submit it electronically following the procedures given in the appropriate Guidelines for Proposal Preparation appendix.

To the extent that the proposer knows the following information by the due date, the Notice of Intent should include:

- (a) Names, addresses, telephone numbers, E-mail addresses, and fax numbers of (1) the Principal Investigator; (2) any Co-Investigators; and (3) the lead representative from each organization (industrial, academic, educational, nonprofit, and/or Federal) expected to be included in the proposal team; and
- (b) Title of the proposed investigation, an indication of which type of investigation it will be (see Section 1.1), and a brief statement of its expected scientific objectives.

## 3.2 Format and Content of Proposals

Appendix A contains general NASA guidance for proposals that is binding unless specifically amended in the body of this AO or in the appropriate, mission-specific Guidelines for Proposal Preparation appendix. In order to facilitate evaluation, NASA requires a uniform proposal format for all proposals submitted in response to this AO. The proposal format can be found in the appropriate Guidelines for Proposal Preparation appendix where other, important guidance for preparing proposals is also given. Failure to follow the outline or the page count limits in the appropriate Guidelines for Proposal Preparation appendix may result in reduced ratings during the evaluation process, or in extreme cases, could lead to rejection of the proposal without review.

### 3.2.1 Certification

An official of the PI's institution who is authorized to certify institutional support and sponsorship of the investigation, as well as the management and financial parts of the proposal, must sign the proposal's cover page. (See details in the appropriate Guidelines for Proposal Preparation appendix.)

### 3.2.2 Quantity

Proposers must provide 30 copies of their proposal, plus the original signed proposal.

### 3.2.3 Submittal Address

Proposals must be delivered to the addresses given in the appropriate Guidelines for Proposal Preparation appendix to this AO.

### 3.2.4 Deadline

The organization at the submittal address must receive all proposals by 5:00 p.m., local time, by the closing date specified in Section 1.3. NASA will treat all proposals received after the closing date in accordance with NASA's provisions for late proposals (Appendix A, Section 7).

### 3.2.5 Notification of Receipt

NASA will notify the proposers in writing or by E-mail that their proposals have been received. Proposers not receiving this confirmation within one week after submittal of their proposals should contact the address given in the appropriate Guidelines for Proposal Preparation appendix to this AO.

## **4. Proposal evaluation and Selection**

### **4.1 Evaluation and Selection Process**

NASA will subject all proposals submitted in response to this AO to a preliminary screening to determine their compliance to the constraints, requirements, and guidelines of the AO. Proposals not in compliance will be returned without further review.

Using the criteria given below, the remaining proposals will then be assessed by an evaluation team made up of panels of peers of the proposers in scientific, technical, management, education/public outreach, and other areas. NASA may also seek to supplement the knowledge and expertise of the panels by obtaining mail-in reviews. The peer panels will have the right to accept, modify, or reject these mail-in reviews.

Once the panel evaluations are complete, an *Ad Hoc* Subcommittee of the Space Science Steering Committee (see below), composed wholly of Civil Servants, will convene to consider the evaluation results. This Subcommittee will categorize the proposals in accordance with procedures required by NASA FAR Supplement Part 1872.0 according to the Categories defined below.

**Category I.** Well conceived and scientifically and technically sound investigation pertinent to the goals of the program and the AO's objectives and offered by a competent investigator from an institution capable of supplying the necessary support to ensure that the investigation can be delivered on time and within budget. Investigations in Category I are recommended for acceptance and normally will be displaced only by other Category I investigations.

**Category II.** Well conceived and scientifically or technically sound investigations that are recommended for acceptance, but at a lower priority than Category I.

**Category III.** Scientifically or technically sound investigations that require further development.

**Category IV.** Proposed investigations that are recommended for rejection for the particular opportunity under consideration, whatever the reason.

The Space Science Steering Committee, which is composed wholly of NASA Civil Servants and appointed by the Associate Administrator for Space Science, will consider the results of the evaluations and categorizations. The Steering Committee will conduct an independent assessment of the evaluation and categorization processes regarding both their compliance to established policies and practices, as well as their completeness, self-consistency, and adequacy of all materials related thereto.

After this review, the NASA Program Scientist for the selection will submit the final evaluations and categorizations to the Source Selection Official who will make the final selections based on the evaluation factors outlined in Section 4.2 (instrument proposals) and Section 4.3 (Science Team Member proposals), on the E/PO factors described in Section 2 of Appendix I (instrument proposals), and on the cost factors outlined in Section 4.4. For the Europa Orbiter and Pluto-Kuiper Express investigations, the Associate Administrator for Space Science has delegated the role of selection official to the Science Program Director for Solar System Exploration, Office of Space Science. For the Solar Probe investigations, the Associate Administrator for Space Science has delegated the role of selection official to the Science Program Director for the Sun-Earth Connection, Office of Space Science.

#### 4.2 Criteria for Evaluation of Instrument Investigation Proposals

For compliant proposals offering flight instrumentation as part of the investigation, NASA will use both evaluation factors, E/PO factors, and cost factors in selecting investigations for this opportunity, following the process described in Section 4.1. The evaluation factors will be determined by evaluating the proposals against five criteria, which are defined more fully in subsections below. The criteria are listed in descending order of priority:

- Scientific Merit and Relevance to Mission Objectives;
- Technical Merit and Probability of Success;
- Mission Impact;
- Cost Risk and Feasibility of Implementation Plan; and
- New Technology

##### 4.2.1 Scientific Merit and Relevance to Mission Objectives

The goals and objectives of the proposed investigation will be assessed to determine the intrinsic scientific merit of the proposed investigation and its relevance to the specific opportunity described in this AO. The evaluation will include an assessment of the degree to which the proposal offers to meet the appropriate mission science objectives, as compared to the strawman instrument packages.

##### 4.2.2 Technical Merit and Probability of Success

Each proposed investigation will be evaluated for its technical merit and probability of success. Technical merit will be evaluated by assessing the degree to which the investigation will address the proposed scientific goals and objectives and the degree to which the proposed instrumentation can provide the data needed to complete the proposed investigation. The

evaluation will include an assessment of whether the proposed instrumentation can acquire the necessary data, whether the proposed integrated and coordinated observing sequence will be sufficient to complete the proposed investigation (in addition to other scientific objectives), the adequacy of the proposed data analysis and archiving plan, and the timeliness of the release of data to the public domain.

The probability of success will be evaluated by assessing the degree of technical risk associated with the proposed instrumentation, by assessing the degree to which the proposed data-acquisition strategy is likely to succeed, and by assessing the scientific and technical competence of the proposed team. Evaluation of the technical risk will include an assessment of the readiness for flight of the proposed instrumentation, the adequacy of plans for developing critical technology, and the adequacy of technical margins. Evaluation of the scientific and technical competence of the proposed team will include an assessment of the relevant experience of the team.

#### 4.2.3 Mission Impact

Each proposed investigation will be evaluated for mission technical feasibility, operational feasibility, and the impact the investigation will have on critical mission resources.

The mission technical feasibility will be evaluated by assessing the degree to which the investigation can be accomplished within the constraints on mission resources given in Section 3.1 of the appropriate Mission and Project Description appendix. The tables of mission resources in those sections list the resources in order of criticality, starting with the most critical resource, and also divides the resources into two groups--higher criticality and lower criticality. The mission technical feasibility will be judged relatively infeasible if any of the limits of "higher criticality" resources are exceeded. Likewise, the mission technical feasibility will be judged relatively infeasible if any of the limits of "lower criticality" resources are exceeded without some corresponding reduction in requirements for other, more critical resources. The offsetting resources do not have to be "higher criticality" resources, but they do have to be above the "over limit" resource on the list.

The evaluation of operational feasibility will include an assessment of the degree to which the mission will be able to support the proposed integrated and coordinated observing sequence. The adequacy of the proposed margins will be evaluated in assessing both the technical feasibility and the operational feasibility.

Although an investigation would be considered technically feasible if the proposed instrumentation were to fit within all the constraints, NASA places considerable value on generating additional reserves in several key resources, with priorities that vary from mission

to mission. The impact on mission resources will be evaluated using the priorities given in Section 3.1 of the appropriate Mission and Project Description appendix. Proposals can get the highest rating for this criterion only if they are found to use significantly less than the limits on one or more resources with the highest mission criticality. Offsetting increases in requirements for resources with lower criticality will not affect eligibility for getting the highest rating.

#### 4.2.4 Cost Risk and Feasibility of Implementation Plan

The technical and management approaches will be evaluated to assess the likelihood that the investigation can be implemented as proposed. The evaluation will include an assessment of the risk of completing the investigation within the proposed cost.

The evaluation will include assessments of

- The proposer's understanding and planned use of the processes, products, and activities required to accomplish the development, integration, test, and operation of the proposed flight instrumentation and supporting systems;
- The capabilities within the team for systems engineering and concurrent engineering;
- The risk of increased cost to the spacecraft and its supporting systems;
- The relationship between the work and the project schedule, as well as the adequacy of margin in the proposed schedule;
- The methods and rationale used to develop the estimated cost, as well as the adequacy of reserves in the proposed cost;
- The effectiveness of the proposed implementing organization, including the proposed roles and experience of the partners and the commitments of partners and contributors;
- The competence of the management team; and
- The degree of support (logistics, facilities, etc.) offered by the proposing institutions in order to ensure that the investigation can be completed satisfactorily;

Innovative cost-saving features, processes, or approaches will be rewarded if proven sound. Investigations proposing new technology will be penalized for increasing risk if the proposal does not also describe adequate qualification test plans or technology backup plans to ensure success. In addition to technical adequacy, budget and schedule reserves must be identified



which would allow the qualification test and backup plans to be implemented within the cost and schedule limits of the total proposed effort.

For the Pluto-Kuiper Express and for Solar Probe, the evaluation will include an assessment of the plans for maintaining expertise and readiness over the long time between mission development and the last encounter.

For the Pluto-Kuiper Express, the evaluation will include an assessment of the potential for delivering the flight instrumentation by November 29, 2002, to support the option of launching in 2003.

#### 4.2.5 New Technology

Plans for both the infusion of new technology and for the transfer of new technology will be evaluated to see if they will have a significant impact in meeting NASA's objectives for advancing the state of the art and making the technical advances available to the people of the United States. The OSS Integrated Technology Strategy is available through Internet URL <http://nic.nasa.gov/oss/>.

#### 4.3 Criteria for Evaluation of Science Team Member Proposals (Europa Orbiter only)

NASA will use the evaluation criteria listed below to evaluate compliant proposals following the process described in Section 4.1. The evaluation factors (which are defined more fully in subsections below) are listed in descending order of priority:

- Scientific Merit;
- Technical Merit and Feasibility; and
- Feasibility of Implementation Plan.

Europa Orbiter Science Team Member proposals offering to serve in the Team Leader position as part of the investigation will be evaluated using the additional criterion

- Suitability for Team Leader Position

##### 4.3.1 Scientific Merit

The goals and objectives of the proposed investigation will be assessed to determine the intrinsic scientific merit of the proposed investigation and its relevance to the specific opportunity described in this AO. The goals and objectives for radar investigations must be explicitly related to data taken by the radar described in Appendix C, the Europa Orbiter

Mission and Project Description. The goals and objectives for gravity field investigations must be explicitly related to data taken by Doppler tracking the spacecraft with capabilities described in Appendix C.

#### 4.3.2 Technical Merit and Feasibility

Each proposed investigation will be evaluated for its technical merit, feasibility, and probability of success based on the strawman set of instrumentation, the spacecraft concept, and the baseline mission described in Appendix C. Technical merit and feasibility will be evaluated by assessing the degree to which the investigation will address the proposed scientific goals and objectives and the feasibility of obtaining and analyzing the necessary data. The evaluation will include an assessment of whether the mission's instrumentation can acquire the necessary data, an assessment of the degree to which mission operations can support the acquisition of the required data, whether the data gathered will be sufficient to complete the proposed investigation, the adequacy of the proposed data analysis and archiving plan, and the timeliness of the release of data to the public domain.

The probability of success will be evaluated by assessing the degree of technical risk associated with the proposed mission operations and by assessing the scientific competence of the PI. Evaluation of the technical risk will include an assessment of the demands on mission operations. Evaluation of the scientific competence of the PI will include an assessment of relevant experience of the PI.

#### 4.3.3 Feasibility of Implementation Plan

The technical and management approaches will be evaluated to assess the likelihood that the investigation can be implemented as proposed. The evaluation will consider the proposer's understanding of the processes, products, and activities required to accomplish the proposed investigation. The evaluation will also include an assessment of the degree of support (logistics, facilities, etc.) offered by the proposing institutions in order to ensure that the investigation can be completed satisfactorily.

#### 4.3.4 Suitability for Team Leader Position

Proposals offering to lead one of the Europa Orbiter Science Teams will be evaluated to assess the likelihood of success of the Team under the proposed leadership. The strategy for organizing the Team and the effectiveness of proposed Team processes will be assessed to see if they are likely to bring out the best scientific performance from the Team and if they will meet the needs of the Outer Planets/Solar Probe Project as described in Section 3 of Appendix C, the Europa Orbiter Mission and Project Description. The experience of the Principal

Investigator in leading similar efforts will be evaluated in order to assess the Principal Investigator's skills and stature among scientific peers as a gauge of his or her ability to organize and manage the effort and to lead the negotiations for the team.

Because the Team Leader of the Europa Orbiter Radar Team will be required to assist the Outer Planets/Solar Probe Project in guiding the development of the facility instrument, NASA is seeking investigators with substantial experience with radar instrumentation for this position.

#### 4.4 Selection Factors

As described in Section 4.1, NASA will select investigations for this opportunity by considering the results of the proposal evaluations--based on the criteria above--along with the proposed cost to NASA.

For proposals offering to provide flight instrumentation, cost may be a significant discriminator in the selection, and proposers are encouraged to make their best offer. It should also be noted that NASA reserves the right to select only a portion of a proposer's investigation and/or to invite his/her participation with other investigators in a joint investigation. In such a case, all affected proposers will be given the opportunity to accept or decline such partial acceptance and/or participation with other investigators (Appendix A, Section 2.)

### **5. Implementation**

Following selection, NASA will notify the PI's of the selected investigations immediately by telephone, followed by formal written notification. The formal notification will include any issues noted during the evaluation that may require resolution. NASA will notify all other proposers in writing that their investigations were not selected and will offer a debriefing. Such debriefings may be by telephone or, if the Principal Investigator prefers, may be conducted in person at NASA Headquarters. NASA funds may not be used to defray travel costs by the proposer for a debriefing.

## **6. Conclusion**

The Outer Planets Program, beginning with the three missions described in this AO, will be an important, new program for extending our research into the outer solar system and close to the Sun itself. NASA's Office of Space Science invites and encourages your participation in this important activity.

Edward J. Weiler  
Associate Administrator  
for Space Science

Carl B. Pilcher  
Science Program Director  
for Solar System Exploration

George Withbroe  
Science Program Director  
for the Sun-Earth Connection

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